



Distribution of uterocervical angle in the second trimester of pregnant women at low risk for preterm delivery

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Objective

To prospectively investigate the distribution of uterocervical angle (UCA) by transvaginal sonography (TVS) in the second trimester of pregnant women at low risk for preterm delivery.

Methods

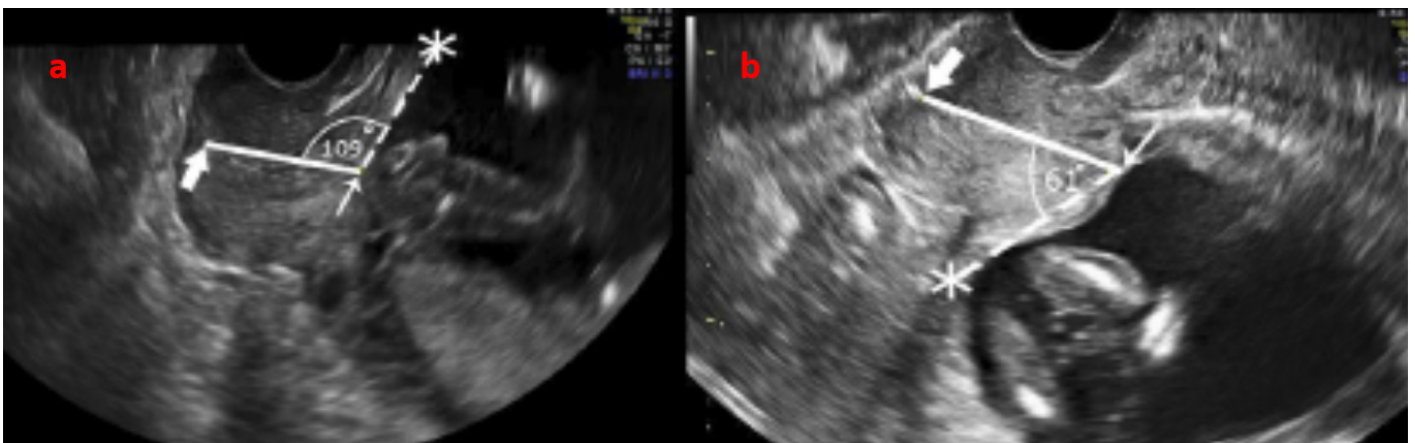
TVS were performed in 280 pregnant women at low risk for sPTB at GA 16 0/7-24 0/7 weeks. Distributions of UCA were visualized using scatter plots against GA in the term groups. Reference range of UCA values and their correlation with GA were assessed using linear regression analysis. In the group of sPTB, linear regression analysis was also used to evaluate correlations between UCA values against GA.

Results

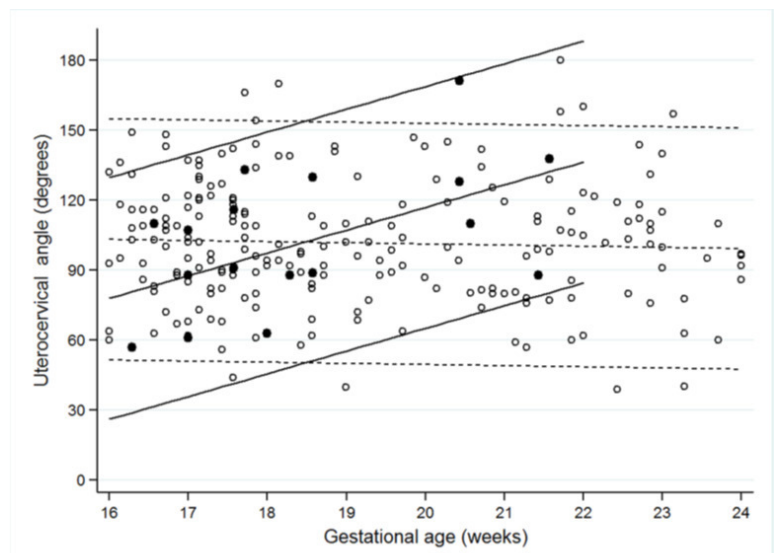
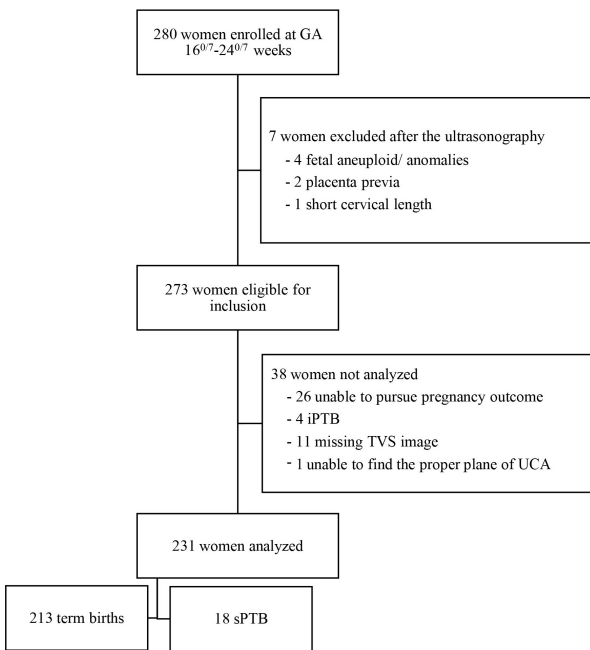
The UCA values from 231 participants were analyzed (231/280, 82. 5%). Eighteen participants had sPTB (18/231, 7. 8%). The range of UCA values in 213 term delivery participants (213/231, 92. 2%) was 56. 4 degrees (95% confidence interval, 39. 8 to 60. 0 degrees) to 157. 7 degrees (95% confidence interval, 145. 5 to 171. 8 degrees) in a dispersed pattern and no significant change of UCA throughout increasing GA. While in the sPTB group, the UCA increased significantly throughout the GA (9. 7 degrees per week, $P = 0. 023$). There was a significant difference in effect of GA to UCA between groups ($P = 0. 008$).

Conclusion

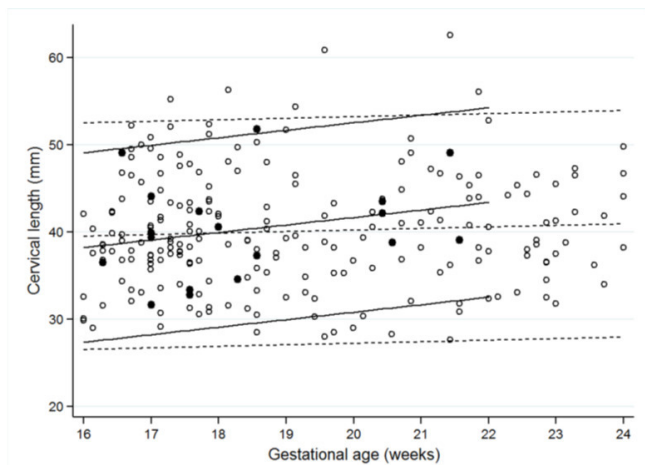
The UCA in the term group had a dispersed distribution during GA 16 0/7-24 0/7 weeks with no significant change of UCA throughout increasing GA. In contrary, the UCA in the sPTB group significantly increased throughout increasing GA.



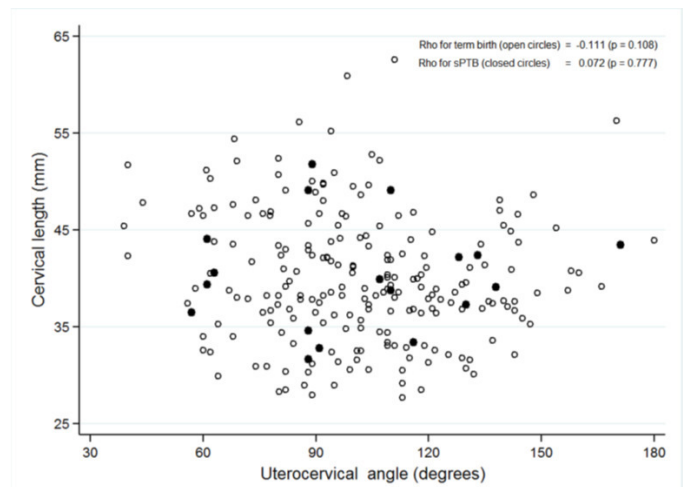
The UCA measurements by TVS. External cervical os (thick arrows), internal cervical os (thin arrows), point of inner lower uterine segment anteriorly 3 cm from the internal os in the anteverted uterus at GA 176/7 weeks (a)/ posteriorly 3 cm in the retroverted uterus at GA 170/7 weeks (b) (asterisks), lines from the internal os to the external os (solid lines), lines from the internal os to the point of intended inner lower uterine segment (dash lines)



Distribution of UCAs by GA among term births (open circles) and sPTBs (closed circles). The lines represent the predicted mean and 2.5th and 97.5th percentiles for term births (dashes lines) and for sPTBs (solid lines).



Distribution of CLs by GA among term births (open circles) and sPTBs (closed circles). The lines represent predicted mean and 2.5th and 97.5th percentiles for term births (dashes lines) and for sPTBs (solid lines).



No correlation was shown between UCA and CL values among term birth (open circles) and sPTB (closed circles).

Table 1 Demographic data, transvaginal sonographic results and obstetric outcomes

Demographic data and obstetric outcomes	Term delivery (n = 213)	sPTB (n = 18)	P value
Baseline characteristics			
Maternal age (years)	35 (29, 37)	35.5 (33.5, 36.8)	0.491
Nulliparous	135 (63.4)	11 (61.1)	1
Gravida	2 (1, 3)	2 (1, 3)	1
BMI (kg/m ²)	22.4 (20.2, 24.7)	22.9 (20.8, 25.2)	0.579
Secondary smoker	16 (7.5)	1 (5.6)	1
TVS measurements			
GA at measurement (weeks)	18.4 (17.1, 21.1)	17.9 (17, 20)	0.274
Cervical length (mm)	40.1 (6.6)	40.4 (5.7)	0.875
Uterocervical angle (degrees)	101.7 (26.4)	101.6 (31.3)	0.987
Obstetrical complications			
Anemia	24 (11.7)	0 (0)	0.229
Overt DM	1 (0.5)	0 (0)	1

Gestational diabetes mellitus	22 (10.3)	4 (22.2)	0.128
Chronic hypertension	3 (1.4)	1 (5.6)	0.279
Pregnancy induced hypertension	6 (2.8)	1 (5.6)	0.438
Premature uterine contraction	3 (1.4)	18 (100)	< 0.001
Delivery status			
GA at delivery (wk)	38.7 (38, 39.4)	36.1 (35.6, 36.4)	< 0.001
Vaginal delivery	91 (42.7)	12 (66.7)	0.050
Cesarean section	122 (57.3)	6 (33.3)	0.050
Newborn status			
Birth weight (kg)	3120 (2858, 3390)	2548 (2252, 2821)	< 0.001
APGAR at 1 min	9 (8, 9)	8 (8, 8)	0.020
APGAR at 5 min	9 (9, 9)	9 (9, 9)	0.417
APGAR < 7 at 5 min	5 (3.1)	0 (0)	1
NICU admission	9 (4.2)	4 (22.2)	0.012

Data are given as n (%), mean (SD), or median (IQR)